

Vegetation Cover within Reestablished Willow Communities

Expectation:	Restoration of a <i>Salix caroliniana</i> wetland shrub community on portions of the floodplain where the historic (prechannelization) willow community has been replaced by mesophytic shrub communities. In these areas, reestablished canopy cover of willow will be > 25% and canopy cover of other species will be < 5%.
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Date:	June 6, 1999
Relevant Endpoints:	Sociopolitical - Nuisance (Exotic) Species Restoration - Biological Integrity - Community Structure Restoration - Biological Integrity - Colonization Rates Restoration - Biological Integrity - Population Abundance Restoration - System Functional Integrity - Habitat Diversity Restoration - System Functional Integrity - Habitat Quality
Baseline Condition:	<p>Although remnant willow communities remain on inundated portions of the channelized floodplain, altered hydrology has allowed mesophytic shrubs such as <i>Myrica cerifera</i>, <i>Baccharis halimifolia</i> and <i>Sambucus canadensis</i> to displace willow as dominate shrubs on the channelized floodplain. In some of the more drained portions of the floodplain, the historic willow communities have been cleared and converted to pasture for cattle grazing.</p> <p>Baseline plant species composition and cover data were collected in July and December 1998 and June 1999 in three 5 m x 20 m plots in the southwest portion of the Pool C floodplain where a 96 ha willow community had existed prior to channelization. This area has remained inundated since channelization but stabilized water levels have led to the development of bog-like vegetation mats that have been colonized by <i>Myrica cerifera</i>. Total canopy cover within these plots ranged from 15-65% and was dominated by <i>Myrica cerifera</i> and <i>Ludwigia peruviana</i> (Table 1). Understory cover ranged from 70-80% and species composition (69 – 79%) and cover (77 – 93%) were dominated by obligate and facultative wetland species, particularly <i>Osmunda regalis</i>, <i>Blechnum serrulatum</i>, <i>Thelypteris interrupta</i>, <i>Woodwardia areolata</i> and <i>Ludwigia peruviana</i>. Willow was found in the canopy of one plot and the understory of two plots but accounted for < 5% of plant cover in each plot.</p>
Reference Condition:	Based on photointerpretation of prechannelization aerial photography (Pierce et al. 1982) 733 ha of the historic floodplain were covered by willow communities, in which shrub cover, primarily <i>Salix caroliniana</i> , was $\geq 30\%$. Willow also lined the banks of the river channel and commonly formed a narrow riparian ecotone between the river channel and floodplain. The identification and delineation (i.e., characteristic signature) of these communities from prechannelization aerial photography suggests that willow dominated the canopy of the historic communities. Based on qualitative observations of remnant willow stands on the floodplain and willow communities that reestablished during the Pool B demonstration project (Toth 1991), the canopy of willow communities is typically dense and composed of predominantly, if not exclusively, <i>Salix</i> . There is no historic data on plant species composition of willow communities of the Kissimmee River; however, based on inundation characteristics associated with the distribution of these communities within the historic floodplain (Toth et al., 1995), the understory likely consisted primarily of obligate and facultative wetland species, particularly shade tolerant species such as ferns (e.g., <i>Blechnum serrulatum</i> , <i>Osmunda cinnamomea</i> , <i>Osmunda regalis</i> , <i>Thelypteris palustris</i> , <i>Woodwardia areolata</i> and <i>Woodwardia virginica</i>).

Mechanism for

Achieving Expectation: Restoration of willow dominated communities in the bog-like areas where baseline plots were sampled will likely require a short period (approximately 2-3 months) of low stages (<33.5 ft) to consolidate the vegetation mat and facilitate colonization and germination of willow seeds. Subsequent reestablishment of fluctuating water levels (Milleson et al., 1980, Toth 1991) and historic hydroperiods will lead to enhanced growth and expansion of remnant willow, which will outcompete mesophytic shrubs and form a dense canopy (Toth 1991). As hydrology and the willow canopy are reestablished, the understory will remain dominated by obligate and facultative wetland ferns and other shade-tolerant species.

Adjustments for

External Constraints: The exotic, climbing fern, *Lygodium microphyllum*, has become established on the floodplain since channelization, particularly in shrub habitats, and could interfere with development of a willow canopy.

Means of Evaluation:

Achievement of this expectation will be evaluated by post-restoration sampling of the permanent plots in southwest Pool C. Plant cover and species composition will be evaluated within these plots three times annually, August-September, December-February and May-June. However, due to seasonal senescence, comparisons of canopy cover estimates with predicted expected values will be based on the August-September sampling period only. As during baseline sampling, canopy cover of each plant species will be estimated using modified Daubenmire cover classes (Table 2), except for canopy cover of *Salix*, which will be estimated to the nearest 1%.

Time Course:

Based on results of demonstration project studies (Toth 1991), willow is expected to expand and dominate the canopy of historic (prechannelization) willow communities three years after fluctuating water level regimes are reestablished. However, reestablishment of willow communities in the bog-like conditions in southeastern Pool C will first require a drawdown period, which may not occur until implementation of phase II-III of the restoration project.

Table 1. Dominant canopy species and cover (July 98) in “historic willow” plots (5 m x 20 m) in the floodplain of the southeast portion of Pool C.

Canopy Cover	Plots		
	VPC 196	VPC 296	VPC 396
<i>Ludwigia peruviana</i>	6-25	6-25	-
<i>Myrica cerifera</i>	51-75	6-25	6-25
Total Canopy Cover	65	55	15

Table 2. Modified Daubenmire scale used for differentiating cover classes of plant species within plots.

Understory		Canopy	
Cover Class	% Cover	Cover Class	% Cover
1	1 – 5	1	1 - 5
2	6 – 25	2	6 - 50
3	26 – 50	3	51 - 90
4	51 – 75	4	> 90
5	76 – 95		
6	> 95		

References

- Milleson, J.F., R.L. Goodrick and J.A. Van Arman. 1980. Plant communities of the Kissimmee River valley. South Florida Water Management District Technical Publication 80-7. South Florida Water Management District, West Palm Beach, FL.
- Pierce, G.J., A.B. Amerson and L.R. Becker, Jr. 1982. Pre-1960 floodplain vegetation of the lower Kissimmee River valley, Florida. Biological Services Report 82-3, Environmental Consultants, Inc. Dallas, TX.
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- Toth, L.A., D.A. Arrington, M.A. Brady and D.A. Muszick. 1995. Conceptual evaluation of factors potentially affecting restoration of habitat structure within the channelized Kissimmee River ecosystem. Restoration Ecology 3: 160-180.